UI Bulletin #189

Subject:	**EV - High Voltage Safety**
Models Years Affected:	2020 - Present
Models Affected:	**ALL ELECTRIC VEHICLES**
Origination Date:	April 5, 2023
Revision Date:	N/A

High Voltage Safety (The following information is derived from GM Service information Document ID: 5869461)

The High Voltage Safety procedure will perform the following tasks:

- Identify precautions when performing service or inspections.
- Identify labels for components, wire harness, and connectors.
- Identify high voltage insulation glove inspection procedure.

When applicable, additional region-specific high voltage service requirements and/or Dangers will be in the General Information, Safety Regulations service category and take precedence over the information presented here.

General High Voltage Dangers

Danger: Always perform the High Voltage Disabling procedure prior to servicing any High Voltage component or connection. Personal Protection Equipment (PPE) and proper procedures must be followed.

The High Voltage Disabling procedure includes the following steps:

- Identify how to disable high voltage.
- Identify how to test for the presence of high voltage.
- Identify condition under which high voltage is always present and personal protection equipment (PPE) and proper procedures must be followed.

Before working on any high voltage system, be sure to wear the following Personal Protection Equipment:

- Safety glasses with appropriate side shields when within 15 meters (50 feet) of the vehicle, either indoors or outdoors.
- Certified and up-to-date Class "0" Insulation gloves rated at 1000V with leather protectors.

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- Visually and functionally inspect the gloves before use.
- Always wear the Insulation gloves with leather protectors when working with the high voltage battery assembly, whether the system is energized or not.

Failure to follow the procedures may result in serious injury or death.

Danger: High voltage circuits should only be tested using a digital multimeter (DMM) and test leads with at least a CAT III rating, such as the J 39200-A Digital Multimeter. Failure to follow the procedures may result in serious injury or death.

Danger: This vehicle is equipped with a high voltage battery that is completely isolated from the chassis ground. Never utilize AC powered test equipment to probe the high voltage system. Serious injury, death and component damage could occur if the high voltage system is grounded through the electric utility.

Failure to follow the procedure exactly as written may result in serious injury or death.

Danger: Before working internally on the high voltage battery, be sure to wear Personal Protection Equipment (PPE) in accordance with National Fire Protection Association (NFPA) 70E, PPE Category 2, Minimum Arc Rating 12 cal/cm 2:

- Safety helmet, face shield and sock hood/balaclava
- Safety rated long sleeve shirt and pants, or safety rated coveralls.
- Hearing protection
- Certified and up-to-date Class "0" Insulation gloves rated at 1000V with leather protectors.
  - Visually and functionally inspect the gloves before use.
  - Always wear the Insulation gloves with leather protectors when working with the high voltage battery assembly, whether the system is energized or not. Failure to follow these precautions could result in serious personal injury or death.

Precautions when Performing Service or Inspections

- Always verify that the high voltage has been disabled before working on or around high voltage components, wires, cables, or harnesses.
- Remove all metal objects such as rings and watches.
- Prepare the area for high voltage work to be performed using the *EL-48900* HEV safety kit which contains safety cones. Set-up hazard buffer zone between the vehicle or high voltage battery placing the safety cones around the vehicle or high voltage battery to prevent entry into the hazard buffer zone, and to alert other technicians that high voltage work is in progress.
- Remove all keyless entry transmitters and secure in a place outside the vehicle.
- Always wear certified and tested high voltage insulation gloves when inspecting or testing any high voltage wires and components.
- Use the "One Hand" rule whenever possible:

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- Work with only one hand.
- Keep the other hand behind your back.

- DO NOT carry any metal objects such as a mechanical pencil or a measuring tape that could fall and cause a short circuit.
- After removing exposed-terminal style high voltage wires, protect and insulate the terminal ends immediately with UL® Listed or equivalent insulation tape rated at a minimum of 600 V.
- Always tighten the high voltage terminal fasteners to the specified torque and recheck. Insufficient or excessive torque will cause malfunctions or damage.
- After finishing work on the high voltage systems and before disengaging the high voltage service lockout, inspect for the following:
  - Verify high voltage system integrity and that all connectors are installed.
  - Verify that all tools or loose components have been removed.

Labels for Components, Wire Harness, and Connectors

The wire harnesses and cables for high voltage circuits are encased in an **orange-colored** covering. In addition, high voltage components such as the Energy Storage System and high voltage cables are affixed with "High Voltage" red danger and orange warning labels.

High Voltage Insulation Glove Inspection Procedure

The following procedure visually and functionally inspects the insulation gloves to be used while performing service on high voltage systems. This inspection procedure should be performed prior to every procedure that requires the use of class "0" insulation gloves rated at 1000 V.

1. Remove the insulation gloves from their leather protector gloves.
2. Inspect the insulation glove certification date:
   - New/unopened gloves may be opened for **first** use within 12 months of the certification date. Always record the date of first opening/use.
   - Glove re-certification must occur within 6 months of first opening/use.
   - Gloves that are unopened must be re-certified within 12 months of the certification date.
   - Gloves with an unknown first opening/use date must be re-certified within 6 months of the certification date.
   - **If the gloves certification age range has expired**

     DO NOT USE the gloves. Have the gloves tested and recertified or replace the gloves. For the North America region visit www.nail4pet.org to find an accredited re-certification laboratory.

   - **If the gloves are within the certification age range**

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3. Trap air in the glove and seal opening. Pinch or roll the opening closed tightly to prevent any air loss.
4. Press glove to increase pressure.
5. Inspect for the following conditions:
    - Pin holes
    - Air leaks
    - Wear, tears, or abrasions
    - Swelling, indicating exposure to chemicals
    - **If glove damage is observed**

      DO NOT USE the gloves. Have the gloves tested and recertified or destroy them and replace. For the North America region visit www.nail4pet.org to find an accredited re-certification laboratory.

    - **If none of the above conditions are observed**
6. All OK. Gloves are OK to use.

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